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(54) DEVICE FOR DETERMINING DATA

(71) I, JEAN MARIE MICHEL PAUL BLANIE, of French Nationality, of 282, Rue Saint Jacques, Paris 5, France, do hereby declare this invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to means for determining the nature of relationships between on the one hand data peculiar to one unit or a group of separate units, and on the other hand data of another unit or another group of separate units, the means comprising at least two information carriers, each comprising a card of transparent or semitransparent material, each card having at least one data-indicating indicia selected from a group of more than two different indicia inscribed thereon at one or more of a range of discrete predetermined locations or addresses, said cards being superimposable so that differing indicia having the same address may be readily distinguished.

On each support, symbols distinctive of these peculiar data are recorded at the addresses corresponding to the unit or group of units corresponding themselves to said support. At the other addresses are recorded the distinctive symbols corresponding to the nature of the relationships between the data of the said units or groups of units, on the one hand, and the data of the other units or groups of units of the assembly on the other hand, these distinctive symbols corresponding to that which will hereinafter be called "assessments", being functions of the nature of the relationships materialized by the distinctive symbols in coded form.

The present invention also relates to the apparatus for the operational realization of devices of the type heretofore described.

In this manner, the present invention enables the data and nature of relationships in an at least three-dimensional system to be recorded with a two-dimensional address system which may be materialized or not on the support, and with a system of suitable assessments and codes.

Hereinafter, for simplicity, the supports will be considered substantially flat (paper, films, cards, sheets, tapes, etc.) on which a system of addresses is marked in two-dimensional cartesian coordinates.

Without leaving the scope of the invention, the expert in the art can readily employ the present invention with other systems of coordinates (for example, polar) for the addresses of the recorded data.

The first examples will be limited for simplicity to a system of assessments of one dimension only, but it is easy for the expert in the art to consider several dimensions and to conceive a code which enables several dimensional systems to be materialized for assessments as illustrated in the following examples:

On a card for example, a set of symbols could be carried having different shapes in accordance with a first dimensional assessment series and different colours in accordance with a second dimensional assessment series.

Hereinafter, the term "element" will signify the subassembly consisting of the unit or group of units corresponding to each support; the phrase "characteristics peculiar to the element" will signify the data corresponding to the element itself and capable of being recorded on the support. These will for example be the

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constituents of the element such as the enumeration of the units, in the hypothesis of a group; the phrase "relationships or relational characteristics" will signify the data corresponding to the relationships between the characteristics or data peculiar to the element corresponding to one support and the characteristics or data peculiar to the other elements of the assembly (e.g. interaction, compatibility, incompatibility, negative or positive interference between elements or units constituting the different elements).

It is well known in the prior art to record element references and their characteristics on a support of any suitable type. Analytical comparison between supports enables one to know if the different characteristics are compatible when one is seeking to establish which relationships can exist between the different elements, for example where one seeks to determine whether, on the contrary, one wishes to avoid certain interaction compatibilities, incompatibilities, positive or negative interferences, or any other type of relationship which may exist between the elements and their constituent units.

To take a simple example, where an installation comprising the circulation of fluids is under construction, it is necessary for the characteristics of the different assembled elements to be compatible between themselves and not to present incompatibilities. One will notably investigate dimensional compatibilities in order that the connections may be made without difficulty, and on the contrary one will seek to avoid incompatibilities between constituent material or between each of them and the fluids designed to circulate through them.

These become operations which are often long and difficult to carry out manually and are very costly when one makes use of automatic equipment. Moreover, on existing supports the operations are generally of two dimensions, and do not allow three or more dimensional data to be recorded.

For example, the most improved punched card systems still operate with a two-dimensional address system on the card and a single-type perforation for one support only allows a relatively limited number of combinations and a data recording capacity which is insufficient for certain uses on the same support.

Manufacturers of large-capacity computers have had to move in the direction of supports comprising a considerable number of addresses by generally making use of magnetic supports which can be used in practice only with the aid of particularly cost machines. Now in

many fields it is indispensable to have rapid access to data of a number of addresses of the order of one thousand to ten thousand, for example, on a single support which greatly surpasses the capacity of traditional punched cards, but does so to an even greater extent when one needs to materialize the assessments themselves in a small number between ten and a hundred or between two and ten, and one runs up against problems which are difficult to resolve without investing time or money to an extent incompatible with the means or anxiety of the user.

The single means which is used in this case requires the user to make a long and difficult comparative reading of the cards and observations, giving rise to a large number of errors.

There exist on the market, card systems with a large number of addresses, for example punched cards, which enable a selection to be made from an assembly of cards of all those carrying a symbol leading to the same address, for example those carrying an oblong hole at one determined point in an assembly of round holes regularly spaced in a chequer pattern.

There also exists optical means which permit the classification of photographic films forming cards provided with a chequer pattern of opaque or translucent squares which enables all cards carrying an opaque square or a translucent square in a determined address on the card to be picked out, but here again these systems cannot go beyond two pieces of information per address (0 or 1, yes or no, translucent or opaque, etc.).

If it is required to increase the capacity of the cards, one is led to perform essentially manual operations which require unremitting attention and considerable time.

Furthermore, in these previous systems, the supports only comprise two-dimensional coordinate systems.

As stated heretofore, the present invention allows operation with supports arranged with the aid of a two-dimensional address system and an assessment system of at least one dimension. It allows not only the investigation of common characteristics peculiar to the data, but likewise all types of relational characteristics between the data peculiar to the various elements of the same assembly. As already stated heretofore and for the sake of simplicity, the first examples are limited to three dimensions with rectangular supports, with addresses in cartesian coordinates, the assessments being of one dimension if the supports form the horizontal reference plane.

Now in the present state of things, the majority of devices used for comparing

two-dimensional supports are not suitable for comparing supports according to the invention, in which it is necessary to distinguish marks of any actual assessment carried at any actual address in relation to marks of other assessments carried at the same address.

Hereinafter, reference is made by way of non-limiting example to a field of application in which the present invention finds an interesting use. It relates to the problem of investigating positive or negative interferences in the medical field. If, for example, a doctor draws up a prescription for a patient, it is necessary for the different medicines, and in particular their constituents, to be compatible between themselves and with the patient himself, with his mode of living, with his alimentary regime, with his climatic or professional conditions, etc.

At the present time there exist no practical means enabling a systematic interference check to be made by the doctor which allows him to carry out his check precisely, rapidly and efficiently and without using a complex and costly apparatus.

The present invention therefore consists essentially in carrying on a support corresponding to each pharmaceutical speciality or constituent of a pharmaceutical speciality, notably each active substance, or corresponding to each family of pharmaceutical specialities, the different positive or negative interferences as heretofore enumerated.

It comprises in the first place placing on each support, under conditions which enable easy retrieval, the nature of the interferences with the complex of other specialities or constituents of active substances, with alimentary regimes and with other conditions of employment as indicated heretofore. To accomplish this, one may use for example a geographical address marking system on the support, for example a classic cartesian coordinate system, as stated heretofore. Then one of the other elements is made to correspond with each address so that one may make a comparison and note the corresponding address by any recording means convenient to the actual nature of the support and the procedure employed, a symbol materializing the nature of the interference between the element to which the card corresponds and the element corresponding to the point of marking considered.

It is possible to group, for example geographically, the marking points corresponding to one family of elements in such a manner for example that the same interference is found on one easily

markable zone, corresponding for example to the complex of antibiotics or to a family of food products.

The user possessing the assembly of supports corresponding to the assembly of elements extracts from it the supports corresponding to the elements for which he wishes to compare characteristics, and by any suitable means such as that described hereinafter he detects the interference symbols carried at the addresses corresponding to the various elements corresponding to the chosen supports, and simultaneously the interferences with other conditions of use which may be carried without forming the object of special supports; for example, if the user wishes to administer of a patient specialities A, B, C and D, he extracts for example from his collection the supports corresponding to A, B, C or D, to their constituents or their active substances indexed in accordance with the family to which they belong. In marking the addresses corresponding to the element carried on each of the cards (A, B, C, D, their constituents or their active substances etc.) comparison is made with the interference symbols which may be carried at the same marking point of the other supports, which enables a determination to be made of any interference between the medicines, but equally one may mark in other support zones symbols of interference with the nature of the patient (for example a diabetic, of such a sex, of such an age, of such a weight), his alimentary regime (for example absorption of alcohol), his condition of life (for example unable to do heavy work or to drive a vehicle), his climatic conditions (for example living in a tropical country), and other conditions (for example time for taking medicines, etc.).

With regard to the nature of the markings, each address must carry markings of different types to which to attribute an assessment, each assessment corresponding for example to a nature of interference. The nature of the markings may change according to the supports, it being evident that one must be able to distinguish them according to their nature, and one may envisage their being distinguished by geometry or by physical characteristics which may themselves be digital or analog and one may well conceive definition of an assessment by the measurement of a quantity linked to the mark (magnetic, optical, electrical or the like).

For a better understanding of the technical characteristics and advantages of the present invention, a description is given of various embodiments which are not limiting either in their manner of practical

operation or in the application to which they may be put, reference being made to the following Figures:

Figures 1, 2 and 7 to 10 represent coded symbols according to the invention.

Figure 3 represents a first embodiment of two supports according to the invention.

Figure 4 represents an example of a coded symbol according to the invention.

And Figures 5 and 6 represent a second embodiment of supports according to the invention corresponding to two pharmaceutical specialities chosen in a determined market.

EXAMPLE 1

On rectangular cards of transparent non-extendable but possibly supple material a chequer pattern of cartesian coordinates is drawn up in which each point of intersection may be considered as an address. One card and one address is made to correspond to each speciality in such a way that on a card corresponding to a given speciality one may carry at other addresses symbols corresponding to interferences, whether with other specialities at addresses provided for this purpose, or with conditions of employment such as enumerated heretofore at other addresses provided in consequence.

This card may carry opaque, translucent or coloured symbols the form of which corresponds to each of the assessments which may be materialized.

Figure 1 shows a set of these symbols enlarged. For example, symbol 1 is that carried at the address corresponding to the speciality which itself corresponds to the card.

The symbol 2 corresponds for example to the assessment 1, the symbol 3 to the assessment 2, and so on.

Experience shows that it is very easy to distinguish between a dozen signs such as 2, 3, or 4, composed of an annular part superimposed on a symbol such as 1, with stubs 6 placed at the periphery of 1, and projecting with regard to the rings. If the 12 stub positions are spaced by 30°, as the figures of a clock face, their position is easily distinguished, for example Figure 2 shows around a symbol such as 1 a certain number of superimposed rings 5 and stubs 2, 3, 7 and 8 corresponding to easily identifiable assessments where, for example, as stated with relation to Figure 1, the stub 2 corresponds to assessment 1 (position 12 on a clock), stub 3 corresponds to assessment 2, stub 7 to assessment 4, and stub 8 to assessment 9.

When the practitioner chooses from his collection of cards those corresponding for example to four specialities which he

wishes to prescribe, the symbols such as 1, possibly surrounded by rings comprising one or more stubs, will appear at the four addresses corresponding to the four specialities; moreover, if the rings and stubs are coloured they are still more easily identifiable, and one can furthermore conceive that with a dozen stub positions and 8 or 9 different colours one can considerably increase the number of possible assessments which may be materialized at the same address.

It one also provides cards corresponding to the different characteristics of the subject (man, woman, from 20 to 30 years old, pregnant woman, woman subject to certain allergies, man living in hot countries, etc.), one may know the interferences of the prescribed specialities at the addresses corresponding to the characteristics of the subject.

In order to facilitate read in, one may provide a casing into which the different cards may be inserted so as to maintain the chequer pattern correctly superimposed and illuminate the assembly from behind, the symbols being formed from suitable materials.

In the present example a system of cartesian coordinates has been imagined, but it is evident that one may operate with other systems of coordinates. Other forms of symbols with or without coloration may equally be envisaged.

EXAMPLE 2

Figure 3 represents diagrammatically two rectangular cards A and B, of transparent semi-rigid material, i.e. supple to the touch but having good dimensional consistency so as to enable the card to recover its exact dimensions if it has been bent or buckled voluntarily or accidentally.

The card A corresponds to an element A, card B to an element B. They are both arranged following a chequer pattern covering the entire surface of each card and diagrammatically represented by dotted lines. The dimensions of the cards and chequer patterns must allow the superimposing of A and B with the two chequer patterns and the edges of the cards corresponding as perfectly as possible.

One may be satisfied with good superimposing of the chequer patterns if the cards are provided with marking means such as symbols or adequate perforations. This may be useful if after long usage the edges and corners of the cards risk becoming worn. One may equally bevel a corner, as is traditional in the field of punched cards for computers, so as to ensure that the cards are all disposed correctly in the card cabinet or when carrying out the comparison operation, and

round the other corners to avoid their deterioration.

5 If it is supposed that cards of type A and B are intended for studying interactions in the field of medicine and pharmacy, the cards are geographically divided into a certain number of zones marked C, P and R bounded by chain-dotted lines. The dotted lines of chequer pattern and the chain-dotted lines bound the zones which may or may not be materialized on the card.

10 Each of the intersections of the chequer patterns constitutes an information address and the zones C, P and R are identical between one card and the other so as to contain the same addresses. Zone C is reserved to the constituents of elements A and B, i.e. to the unit or group of units constituting the element.

20 If the element A or element B are for example medicines, the different units may be the main active or excipient constituent or constituents. If on the other hand it is preferred to have cards in which A and B are not specialities but simply constituents, the units may correspond to the different functions of the active principal, for example to the functions of the molecule.

25 It will be supposed hereinafter that A and B are speciality medicines and that with each address corresponds one constituent of the speciality: a, a', a'' in the case of speciality A; b, b', in the case of speciality B.

30 On card A, at the addresses chosen for a, a', a'' are carried the coded signs or symbols which indicates that at each of the addresses on card A is recorded one characteristic or data peculiar to the element A. It has been chosen here to record constituents but one could equally conceive recording also, in a special zone, the dosage or the form in which the medicine may be administered.

45 For simplicity, the Figure does not carry the coded symbol but the references a, a', a'' to the chosen addresses. Likewise, card B carries the symbols b, b' corresponding to the active substances of B.

50 On card A, outside the addresses of characteristics or peculiar data, all other addresses of zone C may correspond to all other active substances of the complex of considered specialities which have given rise to an assembly of cards such as A and B. It is well to keep a certain number of addresses free for new specialities which may appear on the market. It is equally well, for reasons of comfort and to allow any checks, to regroup in subzones, within C, the active substances of the same family, for example all antibiotics, acetyl salicylic acid and its derivatives, etc. In this manner, on the other addresses of zone C of card A attributed to the active substances other

than a, a', a'' one may carry symbols such as r_b , $r_{b'}$, which correspond to the relational characteristics capable of existing between the constituents of element A and those of element B.

70 Likewise on card B families of signs or symbols may appear such as r_a , $r_{a'}$, $r_{a''}$, corresponding to the relational characteristics capable of existing between the constituents of element B on the one hand and those of element A and its units on the other hand.

75 These relational characteristics may correspond to interactions of any kind and in particular to incompatibilities or interferences.

80 It is evident that if one relational characteristic between A and B appears on card A, the same must be found at least once on card B. For example, if the sign r_b of card A corresponds to a chemical interference between the active substance a and the active substance b, on card B will be found the sign or symbol r_a corresponding to r_b .

85 r_b will be found on A at the same address as b on B, r_a will be found on B at the same address as a on A. The coded signs or symbols recorded at the different addresses may be as those heretofore described.

90 Each pack of cards must therefore be provided with a table of addresses on the one hand and assessments on the other; for example, assessment 0 corresponds to a first symbol or first coded sign which, for simplicity, will also be called 0 corresponding, for example, to the absence of any peculiar or relational characteristic. This will be the case in the present example if there was perfect neutrality between the constituents of element A and element b'.

95 This may be expressed at r_b of card A by a sign or symbol 0 which may likewise be expressed by the absence of any sign recording in the corresponding address. The assessment 1 corresponding to a sign or symbol 1 may likewise correspond to a peculiar characteristic such as at a, a' or a'' on card A; likewise, at b, b' on card B. Likewise, the other assessments 2, 3, 4 etc. may correspond to different relational characteristics, it being evident that in order to avoid errors the cards may carry as clearly as possible, for example at their upper edge, the name or the various possible names of the corresponding element and of the various units which comprise it, i.e. in the case of the present example the name or names of the speciality and the chemical or commercial name or various names of the different active substances.

100 Zone P may be reserved to addresses corresponding to the different characteristics of the patient (age, sex, 130

stature, race, hereditary characteristics, illness, etc.). One may likewise envisage making cards P which carry the characteristics peculiar to the patient leaving zones C to carry the interactions or sensitivities which may be known.

On cards A and B, i.e. on those corresponding to the specialties, zone P must therefore carry relational characteristics in order to indicate for example that a certain medicine may be suitable for infants but not for aged persons, and inversely that a certain other medicine is incompatible with diabetics or with pregnant women, etc. This is expressed by relational signs r_p , r_p' or $r_{p''}$.

With regard to zone R, this may be reserved to the alimentary regime or to the conditions of life of the patient. As in the case of zone P, one may indicate at R if the patient lives in such or such a climatic condition, in an urban or rural environment and if his work is intellectual or manual. Likewise, in zone R of cards such as A or B, an indication will be given of possible interactions with this or that mode of living, for example interferences between an active substance and the ingestion of alcohol, which would give rise to relational signs or symbols r_r , r_r' .

It is interesting to note that on superimposing or comparing cards corresponding to the doctor-prescribed specialties A, B and the card or cards P, R corresponding to the peculiar characteristics of the patient and his way of life one finds at the addresses corresponding to the peculiar characteristics of the constituents of the chosen elements the relational characteristics between these elements at the same addresses on each of the other cards so selected.

It may furthermore happen that one finds at the same address coded signs or symbols corresponding to different assessments or to like assessments which may reinforce or lessen the appraisal of the practitioner in choosing or rejecting one speciality or one active substance. This can equally enable note to be taken of whether the same active substance is found repeatedly in several prescribed specialties, and which is expressed by the superimposing at the same address of several signs or symbols of characteristics or peculiar data.

If, as stated at the beginning of this example, the cards are transparent, it is easy to superimpose them, to make them coincide and to find signs of relational characteristics superimposed on signs of peculiar characteristics.

EXAMPLE 3

A system of cards may be envisaged of

the same type as those of Example 2, but in which the support card assembly is made to correspond to an active substance or a group of active substances and the different addresses to the specialties. This could notably make it easy to find all the specialties or groups of specialties comprising the same active substance, which would enable its double use to be avoided, and would also enable a search to be made for additional effects, including synergetic, and would further enable a documentary or market analysis investigation to be made. By means of symbols coded in accordance with the assessments, one could further materialize dosages, forms of administration, associations with other families of medicine and other relational characteristics.

EXAMPLE 4

Returning to the conditions of Example 2, it will be recalled that one may if required play on the colorations of signs to be recorded. If, for example, the capacity of the card is such as to be able to devote a surface element corresponding to each address of such dimensions as to be able to carry out that stated hereinafter, one may use signs or symbols such as those described below. If, on the contrary, the capacity and dimensions of the card allow only a space to each address which enables the eye to distinguish details only with difficulty, reference may be made to an enlarged element situated either on another support or on the same support in a zone left free, for example in the margin.

Figure 4 represents a symbol of this type which may be used either at each address or with back-reference if enlargement is required for purposes of legibility. The sketch of Figure 4 is likewise enlarged for reasons of comfort. The symbolic sign represents a general square shape divided into four by two orthogonal lines, but this arrangement may apply generally to any other shape and any number of divisions provided it remains legible or discernible by the eye or by any suitable means.

For any symbol divided into n zones (4 in this case) this enables sub-symbols to be provided in each of the zones, i.e. to multiply by 4 or more generally by n the number of assessment dimensions. If, for example, in the case of interactions of medical products, 4 zones are provided, the zone 21 for example may be reserved for physical interactions, zone 22 for positive pharmacological interactions, zone 23 for chemical interactions and zone 24 for negative pharmacological interactions.

In the preceding phrase, use has been made of the word "interactions" which is the most frequent case, but this may just as

well apply to any other relational characteristic (incompatibility, interference, etc.).

Each of the zones 21 to 24 may be the object of coloration in accordance with the chosen assessments. Furthermore, not only the chosen colour may be varied, i.e. the wavelength spectrum, but also the intensity, which corresponds on a transparent support to the transparency of the coloured symbol. This transparency of the coloured symbol may be obtained either by reducing the intensity of the colorant or the thickness of the layer, or by using regular patterns of greater or lesser fineness or space apart.

Each pattern element (for example, a line) may correspond by its colour to a given constituent, which may enable the nature of interaction involving each constituent to be made clear, according to the zone in which it is located. These various systems enable the intensity to be increased on superimposing several supports by reducing the transparency of the assembly or an intense coloration to appear by superimposing supports comprising the same reduced coloration, which corresponds in practice, for example, to different specialities comprising the same component and more especially the same active substance, each at a dosage calculated for the formula of the speciality, but which if they form the object of the same prescription, can lead to a total dosage stronger than that required.

If, for example, as indicated in Figure 2, the symbolic signs in each of the zones are expressed by strips more or less close together, but in different directions from one square to the other, they at once improve the legibility, i.e. the distinction between the different zones 21 to 24 of the same symbol, but this may equally enable reference to be made to the observations or comments carried in the margin of the support in the direction of the different arrows corresponding to the different nature of interactions enumerated heretofore.

The use of a system of stripes, on superimposing, makes it possible to distinguish directional stripes of colours identical to those of the symbols representing the active component substances or equivalents while it nevertheless is possible, if the strips are superimposed to a certain extent, to play on the addition of colours while giving a coded meaning at one and the same time to the simple colours and colours composed by superimposing.

EXAMPLE 5

In this example, one particular

embodiment is described intended for application to the complex of pharmaceutical speciality medicines constituting a definite market, in this case the French market, chosen by way of illustration.

A collection of semi-rigid transparent cards, preferably rectangular, is made up, each corresponding to a speciality in the wide sense of the term; a single card could if necessary correspond to several patterns of presentation, to several dosages or likewise to several pharmaceutical forms.

Each card carries the references of the medicine considered and the name of the manufacturer. The active substances or more generally any constituent which may involve interactions or secondary effects are likewise indicated.

A reference matrix, in this case in cartesian coordinates, is formed in the shape of a rectangle of 100 mm length by 50 mm width.

The following are figured on this matrix:

1. The active substances comprising the speciality and their main and possibly secondary pharmacological classes.

2. Their interactions and the significance of these latter with the other active substances.

3. Any interference between these active substances and certain foods, beverages and products absorbed by respiratory routes, and of other environmental factors such as sunlight, climate, altitude, etc.

4. Possible modifications of these formulas on standard paraclinical (essentially biological) tests, with due distinction between effects to be monitored and effects which disturb results.

5. Frequent or rare undesirable effects.

6. Contra-indications and precautions for use in relation to the characteristics of the patient, such as age, sex or pathological state, and to routes or methods of administration.

The individual cards per speciality are formed on a transparent support starting from an identical matrix. On superimposing two or more cards corresponding to the specialities taken during the course of any treatment, the complex of information appears immediately, in particular the possible interactions and their most current significance.

This matrix is composed of:

40 usable columns

7 free columns for elucidation

3 columns for noting any adherence to one or some secondary pharmacological classes.

Each pharmacological class is assigned a number of lines in accordance with the number of active substances of the class,

say X. This number is thus congruous with X modulus 40.

The active substances occupy the first 75 lines of the mother card. The three columns remaining free are used to indicate if one or more active substances of a speciality belong to one or other secondary pharmacological class.

On the cards set up according to specialities, the active substances are noted by a circle (descriptive code), a number of colours being used if the speciality comprises a number of active substances; when an active substance belongs to one or some secondary classes it is further positioned by a third of a circle of the same colour as the line or lines corresponding to this or these classes and in one of the three columns provided for this purpose.

Interferences between active substances are recorded in lines 1 to 75.

Each interference is noted on the card of the active substance by a relational code variable according to the type of the interference.

Association to be avoided
Potentiation
Inhibition of effect
Interference of another nature
Foods, beverages and environmental factors (lines 76-77-78).

We have devoted three lines of the matrix to this usage.

The interaction between a food or an environmental factor and an active substance is indicated by a correlative code identical to the one used for interferences.

Standard paraclinical tests (lines 79-80-81).

Essentially, this concerns paraclinical tests represented in an official list of biological controls, to which may be added certain customary tests such as:

Electrocardiogram
Electroencephalogram
Depth of visual field measurement
Audiogram

In making a card, each of these items may be coded in two ways according to whether:

the effect of the medicine induces contingent disturbances; the code is then P.

or whether on the contrary it constitutes an important factor in paraclinical monitoring; the code is then S.

Undesirable effects (lines 82-83-84-85)

These undesirable effects are grouped and classified by organs and sets of pathological syndromes.

Each of these items is coded in two different ways:

if frequent: F
if rare: R

Contra-indications and precautions for use (lines 86 to 100).

This section groups the patient's characteristics, routes or methods of administration which may form:

either a counter-indication, coded: θ
or a simple precaution for use, coded: Z

Each point of the reference matrix may thus easily be made to correspond to an active constituent, possibly another constituent, or any other data relative for example to the patients or to their conditions of life, while reserving a certain number of addresses for the future (notably for new products).

As heretofore stated, each card will carry the names or other denominations of the active substances and possible other constituents; after each of them, an indication is given as far as possible of the corresponding address on the matrix. For example, in Figure 5, which represents the card corresponding to the speciality known commercially by the name of "Aspirin Vitamin C of the brand or name M1 produced by the L1 Laboratory" the two active substances have been indicated.

1) acetyl salicylic acid marked on the matrix by its address, i.e. ordinate 8 and abscissa 39.

2) ascorbic acid marked on the matrix by its address, i.e. ordinate 32 and abscissa 16.

Likewise, in Figure 6 corresponding to the speciality known, commercially, by the name M2, produced by the L2 laboratory, the active substance is marked by its address in like manner: probenecide 35-23.

On the common or mother matrix, it is recommended to group the active constituents of one family in the same zone, for example on the same line. The ordinates are then divided by attributing one or more lines to a family:

1 General anaesthetics
2 Local anaesthetics
3 Hypnotics
4 Antiepileptics, etc.

Likewise, these families will themselves be grouped into larger families, for example:

1 to 11 depressants of the central nervous system
12 to 14 stimulants of the central nervous system
15 to 17 medicines of the vegetative nervous system etc.

As stated heretofore, to facilitate marking, the correlative symbols or signs are the same colour in each case as the corresponding circle. It should be noted that on united figures which are black on a white background, confusion is introduced between the colours of the different signs or symbols which does not exist in reality.

To facilitate recognition, a colour code is preferably followed corresponding to the order of listing of the active substances on the speciality card.

5 In Figure 5, the following signs are given which correspond to interactions with the products or families the addresses of which are indicated. For simplicity, all signs corresponding to secondary effects have

been omitted. On the sample or mother matrix, the abscissas 1 to 3 are reserved over the entire height of the ordinates for these latter, but it is evident that one may equally, without leaving the scope of the present invention, reserve any other matrix zone for this purpose.

Signs corresponding to acetyl salicylic acid and all of the same colour:

20	type A—interactions with	
	anorexiant	12,4 to 12,22
	MAO	14,4 to 14,14
	neuroleptics	6,4 to 6,44
	procaine	2,31
	antiparkinsonians	5,4 to 5,17
25	anticoagulants (oral)	26,3 to 26,22
	corticosteroids	34,4 to 34,22
	phenylbutazone	8,34
	salicyls	8,38 to 8,50 except 8,39 (acetylsalicylic acid)
	uricosurics	35,22 to 35,24
30	type B—interactions with	
	phenobarbital	3,21
	type C—interactions with	
	paraminobenzoic acid	38,41
	antithyroids	31,11 to 31,21
35	PAS	39,13
	type D—interactions with	
	diphenylhydantoin or	
	phenytoin	22,8
40	sulfamides	4,13 to 4,18
		29,6 to 29,15
		36,4 to 36,44
	penicillens	37,4 to 37,20
	thyroxine	31,9

Signs corresponding to ascorbic acid and all of a second colour.

45	type B—interactions with:	
	antipyrine or phenazone	8,33
	antropine	17,5
	barbiturates	1,12 to 1,15
		3,4 to 3,26
50	salicyls	8,38 to 8,50 (8,39 corresponds to acetylsalicylic acid, another active substance of said speciality)
	sulfamides	same addresses as above.

55 Figure 6 shows the following signs or symbols which correspond to interactions with the active substance of the speciality considered (probenecide)

	type A—interactions with erythromycine	38,22
	type B—interactions with ethacrynic acid	27,42
	type C—interactions with allopurinol	35,25
	type D—interactions with endometacine	35,20
60	Para-amino-salicylic acid	39,13
	penicillins and sulfamides	same addresses as above.

For reasons of simplicity, this example does not show the other symbolic signs corresponding to secondary or side effects,

environmental conditions, peculiar characteristics of the patient, etc.

However, it could be advantageous to

show in the form of arcs of circles (thirds of circles for example) of the same colour as that chosen for the active substance considered, the adherence to a pharmacological class other than that considered for positioning the product on the mother matrix. For example, aspirin symbolized by a full circle in the antalgic class may appear in the form of arcs in the anti-inflammatory, anti-pyretic or platelette anti-aggregating classes.

If, for example, the abscissas 4 to 50 of one line of the mother matrix have been reserved for a family of active constituents, the free space corresponding to the abscissas 1 and 3 may be used to show arcs of circles corresponding to secondary effects. In this manner, one may see the axes corresponding to the different constituents of one speciality or several specialities lying side by side if one superimposes the cards, and this could be in the form of a series of signs (((without taking account of the chequer pattern of the matrix with regard to the abscissas. One may also show cumulations of main and/or secondary pharmacological effects which would allow explanation of certain reactions of the over-dose type which at present remain unexplained.

Furthermore, by superimposing two or more transparent cards such as those of Figures 1 and 2, in such a manner as to make the coordinate axes and consequently the matrices coincide, if the cards correspond to the specialities prescribed for any treatment, then the coded signs or symbols superimposed on the circles corresponding to the addresses of the active substances or constituents to be considered correspond to interactions, the nature of which is defined above and defined by the term assessment.

As emphasized, in general terms a double correspondence must always exist: if the substance X has an interaction with the substance Y it must equally be found at the address of X on the card corresponding to Y as at the address of Y on the card X.

This correspondence need not be identical; for example X may reduce the activity of Y without its own being reduced.

Moreover, the supports permit permanent self-checking of their exactness because of the fact that any information which does not appear twice when using the supports corresponds to an error or oversight in setting up.

Each card may be accompanied in any suitable form by useful complementary details on the mechanism of the indicated interactions, their significance, and bibliographical references.

In particular, it is advantageous for each of the cards to be contained in a simple

card-holder to facilitate classification and consultation, and which clearly show:

on the back, general information on the product giving the legal data in an order identical for all the cards and in a sequence and grouping which are both logical and of practical interest to the user.

inside, a clear transcription of the interferences, the effects and other data represented in code on the transparent cards.

Thus, when practitioners arrange corresponding cards, their prescription may be easily and rapidly re-examined by them and the interactions or undesirable effects avoided by a single viewing to give revision of their basic prescription and consequently not giving rise to loss of time during daily practice.

Starting from this new base, further modifications to their prescription will be made at a rate and to a degree governed by requirements and new information added in the form either of additional cards carrying new products, or renewal of cards, or of additions which they will themselves transcribe at a reading or for information while awaiting an "updated renewal".

EXAMPLE 6

The procedure may follow that of Example 1, but the support be formed by a photographic process, for example on microfilms. It is then possible not only to carry signs at the different addresses, but equally to include texts on the card enabling the user to find observations or information according to the weight and age of the patient.

The photographic process also enables a film or micro-film to record the table representing the support on a large scale and on which it is easier to carry the signs at the required addresses. The negatives may be easily superimposed by an optical method, for example by projection either of negatives superimposed behind the same projection lens or by a projection lens for each negative, the different projected images being superimposed on a common screen.

Continuing with the subject of applications, a precise study may be made of the important problem in medicine and pharmacy of superimposing doses and also, separately or in combination, the problem of feeding, notably for babies.

Again, on a general level, where it is required to show up the interactions existing between an active substance of a speciality and the assembly of active substances of the other specialities of a definite market, for example the French market, any one speciality is found to exist

in different pharmaceutical forms (pomade, tablets, capsules, ampoules, etc.) in different dosages intended for different manners of administration.

5 Now interactions between the active substances of a speciality and those of other specialities often vary considerably with the above characteristics.

10 Moreover, any interactions between the active constituents of several specialities may vary in accordance with the prescribed posology and in particular the simultaneousness or otherwise of the doses, their frequency and the rapidity or delay in absorbing or eliminating the medicines.

15 It is consequently important to be able to take account of these data in the practical operation of the procedure and construction of the device according to the invention as described heretofore. Furthermore, the symbolic signs may be coded in accordance with the characteristics of the speciality considered.

25 More precisely, this code may be a function of the pharmaceutical form of the speciality considered, the particular dosage of its active substances, its road of administration, and its prescribed posology, in particular the simultaneousness or otherwise of the doses of this speciality with those of the other specialities.

30 Moreover, the coded symbolic signs may be the first symbolic sign corresponding to the address of each active constituent of the speciality, this first symbolic sign being a circle centred on the point of intersection of the matrix corresponding to said address, this circle having a colour which is peculiar to said constituent, the first symbolic sign possessing a portion of different colour to the colour peculiar to said constituent, and this portion of the circle being defined in accordance with the characteristics of the speciality considered.

45 According to other embodiments, the coding of the first symbolic sign comprises a circle centred on the point of intersection of the matrix corresponding to said address, this first circle having a colour peculiar to said component, and a second circle which may be centred as the first circle, but of diameter at least equal to the diameter of this first circle, of which at least a portion possesses a different colour than the colour peculiar to said constituent, and this portion of the circle being defined in accordance with the characteristics of the speciality considered.

55 On the other hand, the coded symbolic signs may be those corresponding to interactions, these symbolic signs being right segments centred on said points of intersection, the length of which corresponds substantially to the diameter of said circles and the position of which

corresponds to a predetermined code, these segments able to possess a portion of colour different to the colour peculiar to said constituent, said portion being defined as a function of the characteristics of the speciality considered. 70

A further embodiment of the coding of symbolic signs relative to interactions may consist of the use of part of the first right segments centred on said points of intersection, the length of which corresponds principally to the diameter of the circles and the position of which corresponds to a determined code, these first right segments being of a colour peculiar to said component, and also second segments parallel to the first and of like length, comprising at least one portion of colour different from the colour peculiar to said constituent, this segment portion being defined in accordance with the characteristics of the speciality considered. 75

Furthermore, the addresses of active constituents may be grouped by zones corresponding to the families of active constituents in accordance with a matrix common to the assembly of cards, these zones being grouped into several regions. Each of these regions may comprise an address zone reserved to secondary effects, in particular in such a manner as to indicate which constituents may adhere to other families in addition to their own address. 80

Symbolic signs for secondary effects of the constituents corresponding to the card considered may be carried at the addresses of said reserve zones. 85

Finally, at least part of the cards may be such that each card of this part is relative either to a class of specialities or active constituents, or to an assembly of specialities or active constituents able to treat one or an assembly of determined illnesses, or to a determined type of subject. 90

EXAMPLE 7

110 Figures 7 and 8 represent two codings, differing according to the characteristics of a speciality, of symbols representing the active constituents of this speciality and carried on the card corresponding to this speciality at their respective addresses. 115

EXAMPLE 8

120 Figures 9 and 10 represent two codings, differing according to the characteristics of a speciality, of symbols representing interactions, i.e. correlative signs.

As stated heretofore, any interactions between the active constituents of the specialities depend on the characteristics of them, i.e. on their galleonic forms, dosages, roads of administration and prescription conditions. 125

As an example of a possible interaction

which is a function of the galenic form, glucocorticoids may be mentioned which, if used in a pommade of which the excipient is penetrating, can interact with active constituents of an administered speciality, while with a non-penetrating excipient these interactions do not appear.

With regard to interactions which are a function of the posology used, an example is aspirin which in small doses, i.e. between 0.5 and 1.5 grams per day, increases hyperuricemia by blocking the tubular elimination of uric acid. In this case, administration of aspirin in small doses at the same time as traditional uricosurics must be avoided.

On the contrary, in strong doses, i.e. above 3 grams per day, aspirin has a uricosuric effect of such a type that its interactions with specialities comprising uricosurics are no longer to be feared.

As an example of interaction which is a function of the road of administration, mention may be made of injectable products of the penicillin class such as ampicillin, methicillin, etc., which administered in the same syringe or the same perfusion liquid, deactivate aminoglycosides such as kanamycin or gentamycin.

On the contrary, when these are administered separately or by different roads, for example one intravenously and the other intramuscularly, the de-activation is no longer produced.

As an example of interaction which is a function of the medical prescription and more particularly of the timing of doses as defined by the prescriber, mention may be made of PAS which, if it is absorbed jointly with isoniazide, inhibits the digestive absorption of this latter, whereas this effect disappears when the doses of each active substance are spaced apart.

Consequently, the possible interactions of the active substances of one speciality with those of the other specialities may be a function of that called in the present description the characteristics of the specialities, this term embracing the complex of factors of the type heretofore described by way of example.

According to these improvements, the symbolic signs are coded as a function of the characteristics of the speciality to which they refer.

Likewise, for example, on the card of a speciality comprising ampicillin in injectable form, one could code the circle carried at the address reserved for ampicillin and which is of a colour characteristic of this latter, by colouring one portion of this circle a different colour, this portion of the circle coloured differently signifying that in the injectable

form the possible interactions with certain active constituents, and especially aminoglycosides, depend upon simultaneous administration in the same syringe.

The significance of this coding may be stated at the head of the card, to the side of the statement of the speciality such as heretofore described.

In the same manner, the symbolic signs of the correlative code may be coded reserving a portion of the segment of colour relative to the interactions, this segment portion being of a colour which differs according to the characteristics of the speciality considered.

In the same manner, two concentric circles or two superimposed lines may be used (Figures 8 and 10) if one wishes to show the interactions of an active substance with the other active substances on the one hand, and the variations of these interactions with one or more characteristics of the specialities which contain them on the other hand.

The coding described heretofore is given only by way of non-limitative example, this coding being nevertheless particularly satisfactory in that it is simple and easy to read, and does not increase the selling price of the print.

EXAMPLE 9

A description has also been given of cards relative to pharmaceutical specialities conceived starting from a mother matrix in which each line comprises 50 abscissas.

Elsewhere, it has been indicated that the addresses of the active constituents may be grouped by zones corresponding to families of active constituents.

Finally, mention has been made of the possibility of reserving zones for secondary effects, for example reserving in the case of each line corresponding to a family of active constituents, abscissas 1 to 3 at which arcs of a circle are represented of a colour identical to the active constituents, these arcs of a circle corresponding to secondary effects, i.e. indicating that the said active constituents belong to other families.

According to one particularly advantageous modification concerning the didactic character of the invention, the common matrix may be considered to consist of three regions in which zones corresponding to families of active constituents are grouped.

These three regions preferably comprise columns of equal height, i.e. carrying the same number of ordinates.

The first region is preferably formed of lines comprising 25 abscissas, one abscissa being reserved for secondary effects, 20 abscissas for symbolic signs relative to

existing active constituents and their interactions and 4 abscissas reserved for new constituents which will later appear.

5 The second region is composed of lines of 15 abscissas of which one abscissa is for secondary effects, 11 abscissas for existing active constituents and 3 for new constituents, whereas the third region possesses lines of 10 abscissas of which 1 is for secondary effects, 7 for existing active constituents and 2 for new constituents. This division permits better classification and better didactic presentation of the common matrix because of the multiplication of lines.

10 In the same way, it may be interesting to use not one matrix of which the elements are grouped by lines or columns, which would risk leaving the ends of lines or columns for example unused, but to divide the classes or sub-classes of active constituents one after the other, as the phrases of a paragraph, but separating them by a blank space analogous to a punctuation, inside which appear distinctive signs, for example those relative to secondary effects.

15 Finally, cards have been envisaged in particular relative to each speciality, and it has been elsewhere mentioned that the device, the procedure and the apparatus possess numerous applications notably in the medical-pharmaceutical field.

20 To facilitate the work of the prescribers, notably doctors, in the assembly of such cards, at least part of these cards are advantageously such that each of the cards of this part is relative to a class of specialties suitable for treating one or a complex of determined illnesses, or is relative to a determined type of illness.

25 For example a card may be made relative to diabetics on which will be represented all incompatibilities and interactions of the assembly of active constituents with this type of patient.

30 When the doctor prescribes a speciality for a diabetic, he needs only to superimpose the card relative to diabetics on those relative to prescribed specialties or to a group of specialties in order to be warned of possible incompatibilities.

35 Likewise, cards may be made relative to the patient himself and his characteristics (age, sex, constitutional or acquired syndromes, etc.) which by superimposing on other cards relative to medicines, groups of medicines or illnesses, allow dangerous therapeutics to be eliminated and the choice of the prescriber to be guided.

40 With regard to materialization of the assessments and addresses, they may evidently always be coded directly or indirectly, digitally or analogically, especially with regard to assessments, for

analogy as already stressed. This can have the advantage of allowing the formation of 3-dimensional matrices which can be referred to a body of data or characteristics or more generally to a reference table or dictionary giving all the information peculiar to each of the studied elements of comparison.

45 With regard to the formation of the supports according to the invention, a certain number of techniques exist which allow their manufacture to be simplified, for example for numerous medicines which interfere with antibiotics, consideration could be given to uniformly colouring the whole zone reserved on each support for antibiotics, referring to Example 1, which makes it more easily readable and makes any interference with the products materialized with an entire family of addresses stand out very clearly and particularly easily. Inversely, the supports corresponding to the various antibiotics may carry large zones of incompatibility corresponding to families of products incompatible with antibiotics.

50 As demonstrated heretofore, the present invention finds its application, among others, in the medical or pharmaceutical field where the investigation of interactions or incompatibilities is fundamental to the doctor in drawing up the prescription and its execution by the pharmacist, but the expert in the art will find numerous other uses without modifying the concept of the invention in very different fields, for example in agriculture in choosing fertilizers according to the ground and cultures, or more generally in all fields where co-operation may be made to take place between at least two elements or where interactions are to be sought or avoided, and in the field of human, animal or vegetable alimentation and as a general rule in all those fields in which the correlative characteristics between the elements may be brought to notice.

WHAT I CLAIM IS:—

55 1. Means for determining the nature of relationships between on the one hand data peculiar to one unit or a group of separate units, and on the other hand data of another unit or another group of separate units, the means comprising at least two information carriers, each comprising a card of transparent or semi-transparent material, each card having at least one data-indicating indicia selected from a group of more than two different indicia inscribed thereon at one or more of a range of discrete predetermined locations or addresses, said cards being superimposable so that differing indicia having the same address may be readily distinguished.

2. A means as claimed in Claim 1, wherein all the indicia are in coded form.
3. Means as claimed in Claim 1 or Claim 2, wherein the locations are determined by an address system which is two dimensional.
4. Means as claimed in any one of Claims 1 to 3, wherein the indicia are divided into several zones each corresponding to one series of assessments.
5. Means as claimed as in any one of the preceding claims, wherein the indicia are coloured signs corresponding to a predetermined code.
6. Means as claimed in any one of the preceding claims, and applied to the determination of interactions between active constituents of products such as drugs in which each carrier is peculiar to one product or to an active constituent thereof and the indicia on each carrier are arranged by means of a system of addresses common to the carriers wherein on each carrier there is produced a common matrix on which a respective address is assigned to each active constituent to be considered, a first marking on each carrier indicating the address of each constituent of the respective product, a series of indicia representing, at all or some of the other addresses of the common matrix, any interactions between the constituents corresponding to that carrier and those corresponding to said other addresses.
7. Means as claimed in any one of the preceding claims, wherein the carriers are rectangular cards.
8. Means as claimed in Claim 6, or Claim 7, wherein the matrix is rectangular and is located in an identical position from one carrier to another so that the matrices can be made coincident by superimposing the carriers.
9. Means as claimed in Claim 6 or 8 wherein the addresses of the active constituents are grouped by zones corresponding to the families of active constituents.
10. Means as claimed in Claim 9, wherein each matrix line corresponding to a given ordinate is attributed to one family of active constituents.
11. Means as claimed in Claim 6, 8, 9 or 10, wherein when one carrier corresponds to a speciality comprising several active constituents, the indicia corresponding to each of the constituents and to its interactions are of a colour peculiar to said constituent.
12. Means as claimed in Claim 11, wherein colours are issued to the constituents carried on any one carrier in accordance with a code corresponding to the order of listing of the constituents carried on said carrier.
13. Means as claimed in any one of Claims 6 or 8 to 11, wherein a first indicia at the address of the constituent itself is a circle centred on the point of intersection of the matrix corresponding to the address.
14. Means as claimed in Claim 13, wherein the diameter of said circle is at most equal to the distance between two consecutive points of intersection of the common matrix.
15. Means as claimed in any one of Claims 11 to 14 wherein the other indicia corresponding to interactions are right segments centred on said points of intersection, the length of which corresponds substantially to the diameter of said circle and the position of which corresponds to a predetermined code.
16. Means as claimed in any one of Claims 6 or 8 to 15, wherein at least one zone of the addresses of the matrix is reserved for secondary effects.
17. Means as claimed in Claim 16, wherein some addresses of said zones are reserved for indicating if the constituents can belong to more than one family.
18. Means as claimed in any one of Claims 16 or 17, wherein said reserved zones are situated in the immediate vicinity of the zones corresponding to the addresses of the active constituents of said family.
19. Means as claimed in any one of Claims 16, 17 or 18, wherein each constituent in said reserved zones is represented by an indicium of the colour chosen for the constituent considered.
20. Means as claimed in any one of Claims 11 to 19, wherein other addresses are reserved for environmental conditions of the subjects to be treated and for corresponding interaction and secondary effects.
21. Means as claimed in Claim 20, wherein certain addresses are reserved for products of the beverage, food and tobacco type and the like, or their constituents, and for the corresponding interactions and secondary effects.
21. Means as claimed in Claim 20 or 21, wherein certain addresses are reserved for modification induced in biological analyses and paraclinical tests.
23. Means as claimed in any one of Claims 20 to 22, wherein other addresses are reserved for characteristics peculiar to patients.
24. Means as claimed in any one of Claims 20 to 23, wherein other addresses are reserved for side effects.
25. Means as claimed in any one of Claims 16 to 24, wherein the indicia of the secondary effects of the constituents corresponding to a particular carrier are carried in said reserved zones.
26. Means as claimed in any one of

Claims 16 to 24, wherein the indicia consist of simple geometrical patterns.

27. Means as claimed in any one of Claims 16 to 26, wherein the indicia consist of patterns of a type comprising ideograms and letters of the alphabet.

28. Means as claimed in any one of Claims 6 to 27, wherein the indicia are coded according to the characteristics of the speciality considered.

29. Means as claimed in Claim 28, wherein the code for the indicia is a function of the pharmaceutical form of the speciality considered.

30. Means as claimed in Claims 28 or 29, wherein the code for the indicia is a function of the particular dosage of the active constituents of the speciality considered.

31. Means as claimed in any one of Claims 28 to 30, wherein the code for the indicia is a function of the manner of administration of the speciality considered.

32. Means as claimed in any one of Claims 28 to 31, wherein the code for the indicia is a function of the posology of the speciality considered.

33. Means as claimed in Claim 32, wherein the posology comprises an indication as to whether the dosage of the speciality considered are simultaneous or otherwise with those of other specialities.

34. Means as claimed in any one of Claims 28 to 33 in which the coded indicia are the first indicia at the address of each active constituent of the speciality, this first indicia being a circle centred on the point of intersection of the matrix corresponding to said addresses, this circle having in part a colour peculiar to said constituent and in part, a colour different from the colour peculiar to said constituent, this second part of the circle being defined in accordance with the characteristics of the speciality considered.

35. Means as claimed in any one of Claims 28 to 33 in which the indicia are the first indicia at the address of each active constituent of the speciality, this first indicia comprising a circle centred on the point of intersection of the matrix corresponding to said address, and having a colour peculiar to said constituent, wherein a second circle centred at the centre of the

first circle but of diameter at the most equal to the diameter of this first circle comprises at least one portion of a colour different from the colour peculiar to said constituent said portion of the circle being defined in accordance with the characteristics of the speciality considered.

36. Means as claimed in any one of Claims 34 or 35 in which the coded indicia correspond to interactions, these indicia being right segments centred on said points of intersection, the length of which correspond substantially to the diameter of said circles and the position of which correspond to a predetermined code, wherein one portion of this segment is of a colour different from the colour peculiar to said constituent, this coloured portion of the segment being defined in accordance with the characteristics of the speciality considered.

37. Means as claimed in any one of Claims 28 to 36, in which the coded indicia are those corresponding to interactions, these indicia being the first right segments, of colour peculiar to said constituent, centred on said points of intersection, the length of which corresponds substantially to the diameter of the circles and the position of which corresponds to a predetermined code, wherein second segments parallel to the first right segments and of like length comprise at least one portion of a colour different from the colour peculiar to said constituent, this segment portion being defined in accordance with the characteristics of the speciality considered.

38. Means as claimed in any one of Claims 28 to 37, in which the addresses of the active constituents are grouped by zones corresponding to families of active constituents, wherein the matrix comprises several regions which group together a collection of zones corresponding to families of active constituents.

39. Means arranged, constructed and adapted to operate substantially as hereinbefore described with reference to Figures 1—4, Figures 5 and 6 or Figures 7 to 10 of the accompanying drawings.

MARKS & CLERK.
Agents for the Applicant.

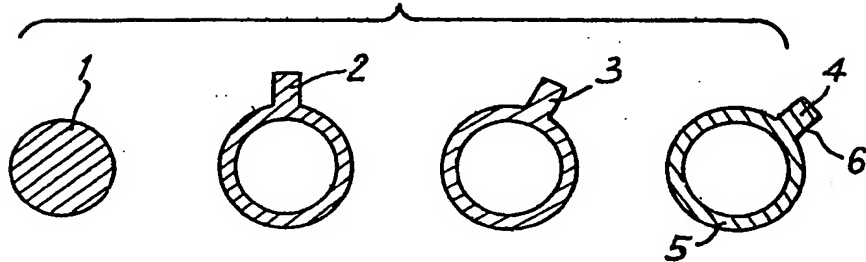
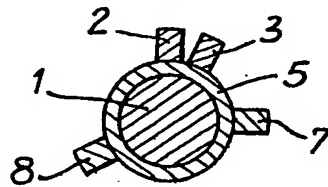
Fig:1*Fig:2*

Fig. 3

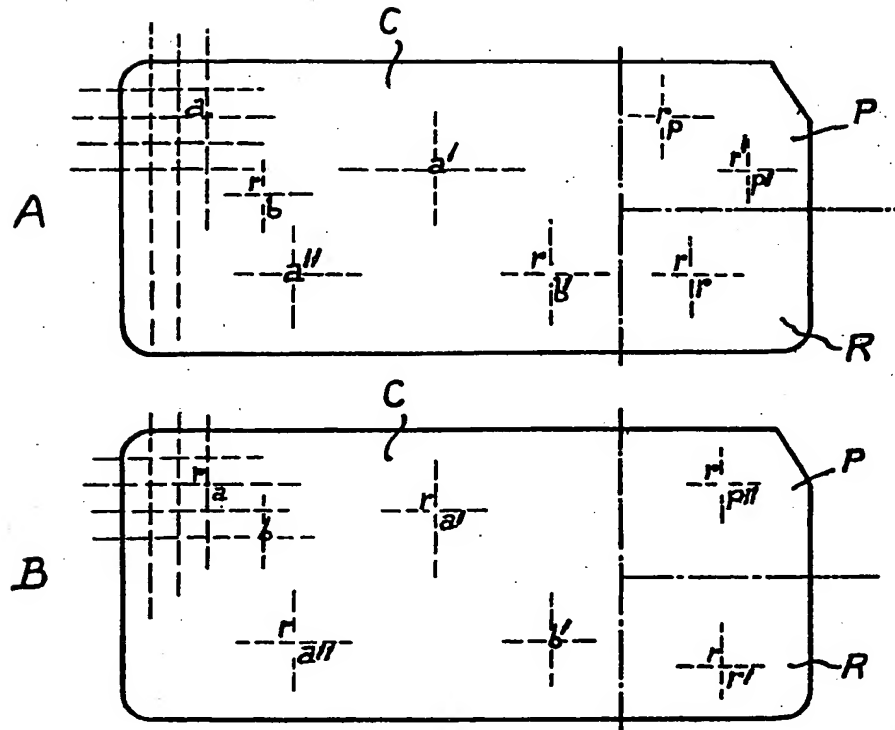
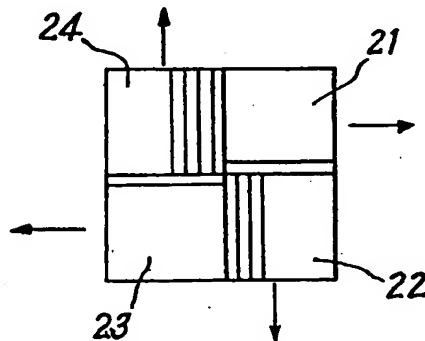


Fig. 4



1 500 137

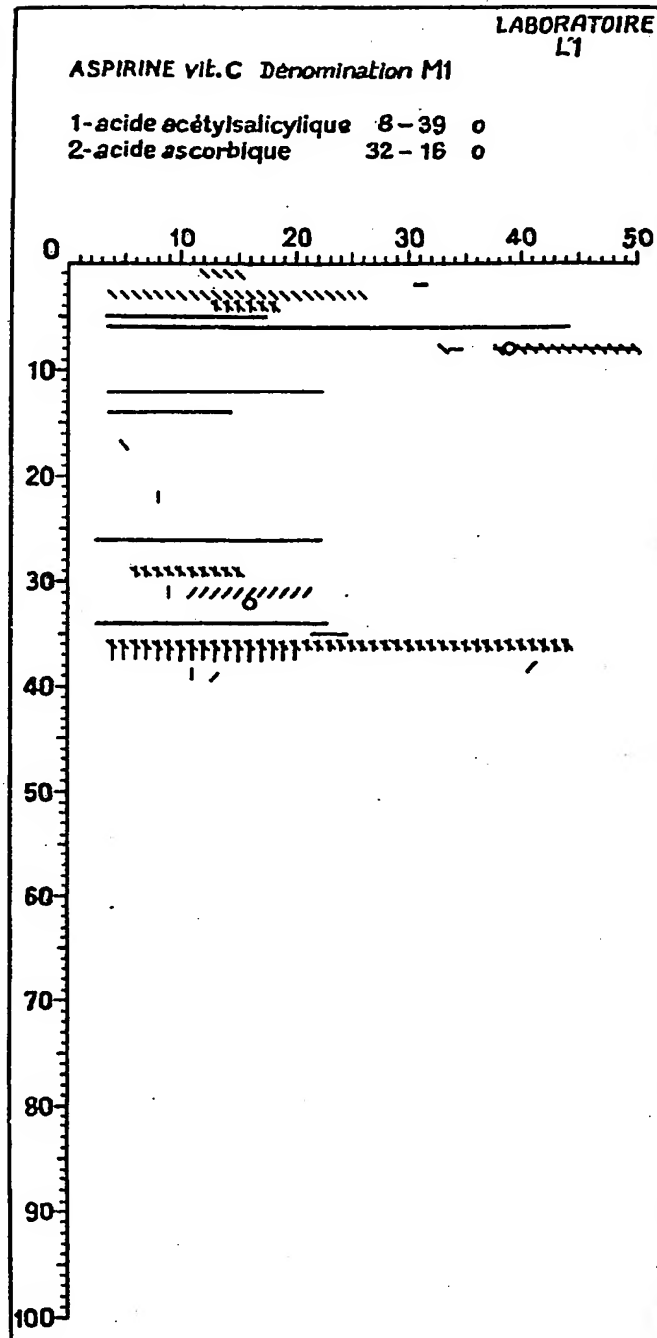
5 SHEETS

COMPLETE SPECIFICATION

This drawing is a reproduction of
the Original on a reduced scale.

SHEET 3

Fig. 5.



1 500 137

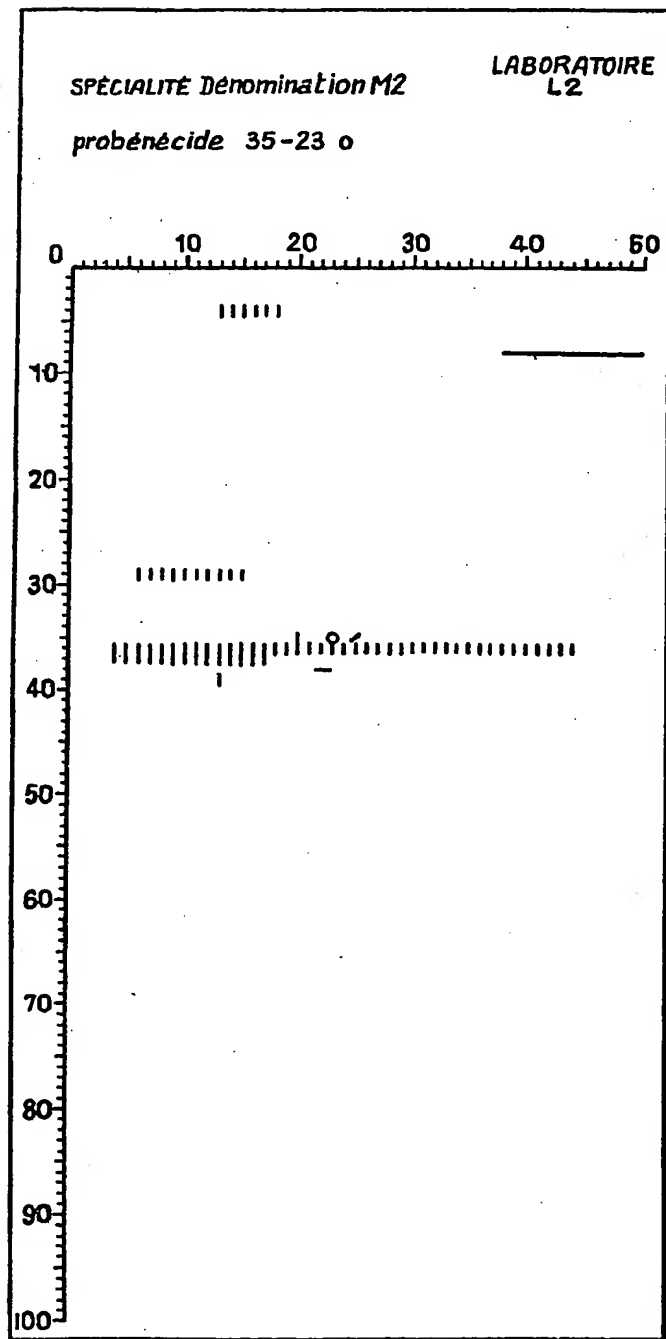
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SHEET 4

Fig. 6



I 500 137

5 SHEETS

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SHEET 5

